Title: Distribution of '*Candidatus* Liberibacter asiaticus' (citrus greening) in citrus and dodder plants

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Abstract:
Citrus huanglongbing, or greening disease, may damage the citrus industry to the point that an orange juice industry will no longer be viable. A non-culturable member of the alpha proteobacteria, '*Ca*. Liberibacter asiaticus', is consistently associated with the disease. This bacterium is transmitted by citrus psyllids and grows systemically in infected citrus phloem tissues. Previous work on the disease led researchers to believe that the pathogen does not reach high population levels in infected citrus. We developed a quantitative PCR based assay for the pathogen and have used the assay to characterize the distribution of the pathogen in sweet orange trees. Although the distribution of the pathogen is extremely non uniform within infected citrus, the pathogen does reach very high populations (10^{10}/gm) in some samples. '*Ca*. Liberibacter asiaticus' can be readily detected in citrus leaves, bark, roots, fruit and seed using this assay. The presence of the pathogen at high levels in seed raises the question of whether otr not the pathogen can be transmitted vertically by seed. The parasitic dodder plant *Cuscuta indecora* has been used previously to transmit '*Ca*. Liberibacter asiaticus' into non citrus hosts. We have characterized the distribution of the pathogen in the dodder plant as well and find that the pathogen grows well in this host, but that the distribution is remarkably non uniform. The ability of the pathogen to move systemically in infected citrus is key to its ability to cause disease, and to be detected by the huanglongbing suppression programs. PCR-based assays are essential to the disease suppression effort, because the symptoms caused by huanglongbing can be indistinguishable to those caused by other pathogens of citrus.